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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/810,225
Filing Date: March 19, 2001
Appellant(s): ONO ET AL.

MAILED
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GROUP 1700

Jennifer M. Hayes
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 1, 2006 appealing from the Office action mailed August 15, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,825,124	SIGAI	4-1989
5,998,047	BECHTEL ET AL	12-1999
5,039,654	MIZUTA ET AL	8-1991
4,946,707	KASENGA ET AL	8-1990

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sigai (U.S. Patent 4,825,124, hereafter '124) and Bechtel et al. (U.S. Patent 5,998,047, hereafter '047) in view of each other.

'124 teaches a process for coating a fluorescent lamp phosphor excitable to fluorescence by ultra-violet radiation for improving lumen maintenance of fluorescent lamps comprising the

steps of depositing a continuous aluminum oxide coating on individual particles of a finely-divided fluorescent lamp phosphor powder to form individually and continuously coated phosphor particles (col. 1, lines 65-67-col. 2, lines 1-11). A fluorescent lamp phosphor comprises *any* material excited to fluorescence by ultra-violet radiation. Examples of such phosphors include, but are not limited to, alkaline earth halophosphate phosphor and manganese-doped zinc orthosilicate phosphor. See col. 3, lines 33-38. The process comprises the steps of mixing a phosphor, e.g. a manganese-doped zinc silicate phosphor, with an aluminum oxide precursor and calcining to form an aluminum oxide coating (col. 21, line 44-col. 22, line 24). In a preferred embodiment, the aluminum oxide coating is deposited by chemical vapor deposition in a fluidized bed (See column 3, lines 40-44). The precursor may be an acetylacetonate (i.e., a coupling agent with a 1,3-diketone structure) and aluminum alkoxides (col. 3, lines 40-49, col. 4, lines 31-53). Preferably, the fluidized particles are exposed to the vaporized aluminum containing precursor material at a first temperature, the first temperature being less than the temperature at which the precursor material *decomposes* (col. 4, lines 1-5). <u>After the particles have been enveloped by the precursor material</u>, the precursor material is reacted to form a continuous aluminum oxide coating on the surface of the individual particles at a second temperature, the second temperature being greater than or equal to the temperature at which the precursor material reacts to form aluminum oxide (col. 4, lines 5-11). Although '124 demonstrates that its method is applicable to different phosphors that need protection (Examples), '124 does not explicitly teach the use of aluminate phosphors.

'047 teaches that phosphors excitable by UV-radiation such as aluminate phosphors need protective coatings in order to increase their operative lifetimes (col. 1, lines 33-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied a method of '124 for coating aluminate phosphors with the expectation of providing the desired increase of their operative lifetimes since '124 teaches that UV excitable phosphors of any material that need protection can be protected by its method, and '047 teaches that phosphors excitable by UV-radiation such as aluminate phosphors need protective coatings in order to increase their operative lifetimes.

<u>Note that claimed concentration limitations of the precursor material enveloping the surface of the individual particles would be obvious absent a showing of criticality</u>.

Claims 1, 3-4, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasenga et al. (U.S. Patent 4,946,707, hereafter '707) in view of Mizuta et al. (U.S. Patent 5,039,654, hereafter '654) and Bechtel '047.

Claims 1, 3, and 15: '707 teaches mixing a manganese-doped zinc silicate phosphor with aluminum nitrate as a solution in water (col. 1, lines 67-68) and firing (i.e., calcining) at 750-800 ^{0}C to form an aluminum oxide coating (col. 2, lines 25-31, 46-68).

'707 does not teach the use of an aluminum 1,3-diketone coupling agent as the precursor.

'654 teaches that ***any*** metal compound precursor can be used for forming metal oxide on the surface of an inorganic substrate such as metal or metal alloy or metal oxide (col. 3, lines 5-14) as long as it gives an oxide upon calcinations (col. 2, lines 18-19). A metal compound which is decomposed at a temperature of at 200-900 ^{0}C may be suitably used (col. 2, lines 18-21). Above all, metal compounds having an oxygen atom directly bonded to the metal, such as organic acid salts, alkoxides, acetylacetonates (which have a 1,3-diketone structure) and nitrates, are preferably used because of ease in converting them into metal oxides upon calcinations (col. 2, lines 32-36). Any solvent may be used as long as it can dissolve the metal compounds (col. 2, lines 42-43) such as organic solvents (col. 2, lines 43-57) and water (col. 2, lines 57-58). The concentration of the coating solution is not specifically limited but is, generally, 3-40 % by weight (col. 2, lines 66-67). In other words, '654 teaches that nitrate (as an aqueous solution) is functionally equivalent to other precursors, including acetylacetonate (as a solution in an organic solvent), as precursors to form metal oxides upon calcining at 200-900 ^{0}C. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an aluminum acetylacetonate instead of aluminum nitrate with a reasonable expectation of success and with the expectation of similar results because acetylacetonates are known equivalents to nitrates as metal oxide precursors.

'707 and '654 do not explicitly teach the use of their methods to coat aluminate phosphors, but '047 teaches that such phosphors benefit from protective coatings, as discussed above. Taking the references as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of '707 and '654 to have coated the aluminate phosphors of '047 because '047 teaches that the aluminate phosphors

benefit from coatings that increase their lifetime, and '707 and '654 teach coatings that extend phosphor lifetimes.

Claim 4: The concentration of aluminum is critical for sufficient absorption of the aluminum (col. 2, lines 11-12). The concentration is modified by changing weight of precursor in the solutions to which the same amount of phosphor is added (i.e., by controlling the ratio of the weight of the precursor to that of the phosphor) (col. 2, lines 45-68). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the weight ratio of aluminum acetylacetonate to the phosphor through routine in order to have assured sufficient adsorption.

(10) Response to Argument

Applicant's arguments filed June 1, 2006 have been fully considered but they are not persuasive.

(A) Appellants submit that the coating of '124 is obtained by reacting an aluminum containing precursor material deposited on the surface of phosphor. Col. 3, lines 42-46. On the other hand, '047 specifically teaches a coating material including catena-polyphosphates that do not react with the UV phosphors to achieve a coating that is not subjected to degeneration when the UV-phosphor is excited by UV-radiation due to the inability of the catena-polyphosphates to react with the UV-phosphors. Col. 1, lines 33-37. Thus, the two references employ different types of coating materials.

The Examiner disagrees. '124 teaches that lifetime of a phosphor of **any** material excitable by ultra-violet radiation can be extended by its method. Therefore, a precise mechanism of forming the aluminum oxide coating on the surface of the phosphor particle is utterly irrelevant. One of ordinary skill in the art would have reasonable expectation of success to extend lifetime of an aluminate phosphor by '124 method because '047 shows that UV excitable aluminate phosphor needs a protective coating to extend lifetime and '124 teaches that a phosphor of **any** material excitable by ultra-violet radiation can be coated by its method to extend lifetime of the phosphor. The fact that '047 offers one of method of protection of an aluminate phosphor to extend lifetime does not mean that it cannot be protected by other

methods. In other words, aluminate phosphor can be coated by any suitable method of protection including a method of '124 as well.

(B) Appellants argue that '047 teaches away from the use of coatings that read with the phosphor substrate. The object of '047 is to provide a coating which is not subject to degeneration when the phosphor is excited by UV-radiation. Column 1, lines 35-37. This object is achieved by using anhydrous catena-polyphosphates which form a hard water insoluble coating on the phosphor particles and do not react with the UV-phosphors such that even when the catena-polyphosphates are exposed to radiation, they do not degrade like the aluminate phosphors. Column 1, lines 44-60. Therefore, US '047 teaches away from a coupling agent that would react with an aluminate phosphor as in US '124 and in the present invention.

The argument is unconvincing because '047 does not contain a statement of inoperability necessary to rise to the level of a teaching away. Applicant is reminded that failure to teach a concept is NOT the same as "teaching away" from a concept. <u>The argument is also unconvincing because it is not commensurate in scope with the claim, which do not require reaction with the substrate</u>. The teachings of '047 of particular methods of protecting phosphors in no way disguise the teachings of '707, '654, or '124 of other suitable methods of protecting the phosphors, as was discussed above.

(C) Appellants argue that '654 does not teach coating methods employing aluminate phosphors and therefore does not teach mixing an aluminate aluminate phosphor with a coupling agent comprising an aluminum compound as in present claim 15. Further, US '654 is non-analogous art. US '654 is directed to a superconductive material and is in a different technical field from '707. Thus, one of ordinary skill in the art would not have been motivated to combine the references as suggested by the Examiner.

The argument is unconvincing. '654 and '707 are both directed to coating inorganic substrates of metal and/or metal alloy and/or metal oxide with a metal oxide by applying a solution of a metal precursor in a suitable solvent and calcining the applied metal precursor at temperature of up to 900 ^{0}C. Therefore, '654 is analogous art as being reasonably pertinent to the particular problem with which the applicant was concerned as well as '707.

It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

(D) Appellants argue that '047 teaches away from a coupling agent that would read with an aluminate phosphor as in the present invention. On the other hand, US '707 is concerned with manganese adivated zinc silicate phosphor (see column 1, Lines 20-21) and not an aluminate phosphor, Therefore, it follows that, based on the teachings of the references, one of ordinary skill in the art would not have been motivated to modify or combine '047 with '707 ('654 is considered as non-analogous art as discussed above) and to employ a coupling agent comprising an aluminum compound as an aluminum oxide precursor to form an aluminum oxide coating on an aluminate phosphor as provided for in present claim 15.

The argument is unconvincing because one of ordinary skill in the art would have reasonable expectation of success of using the method of '707 and '654 to extend a lifetime of *any* inorganic phosphor needed a coating protection including aluminate phosphor because '707 and '654 teach that their method is suitable for extending a lifetime of *inorganic* (an manganese adivated zinc silicate) *phosphor* by coating it with aluminum oxide and '047 teaches that *inorganic* aluminate *phosphor* needs a protective coating to extend a lifetime.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Primary Examiner
Art Unit 1762
July 3, 2006

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